

## **General Disclaimer**

### **One or more of the Following Statements may affect this Document**

- This document has been reproduced from the best copy furnished by the organizational source. It is being released in the interest of making available as much information as possible.
- This document may contain data, which exceeds the sheet parameters. It was furnished in this condition by the organizational source and is the best copy available.
- This document may contain tone-on-tone or color graphs, charts and/or pictures, which have been reproduced in black and white.
- This document is paginated as submitted by the original source.
- Portions of this document are not fully legible due to the historical nature of some of the material. However, it is the best reproduction available from the original submission.



TABLE OF CONTENTS  
HYDROMECHANICS AND HEAT AND MASS EXCHANGE IN  
WEIGHTLESSNESS (RUSSIAN BOOK)

V.S. Avduyevskiy and V.I. Poleshayev  
Editors

Translation of "Gidromekhanika i Teplo-massoobmen  
v Nevesomosti," Academy of Sciences USSR, Institute of  
Problems of Mechanics, "Nauka" Press, Moscow, 1982,  
pp. 261-263.

(NASA-TM-77533) HYDROMECHANICS AND HEAT AND  
MASS EXCHANGE IN WEIGHTLESSNESS (RUSSIAN  
BOOK): TABLE OF CONTENTS (National  
Aeronautics and Space Administration) 5 p  
HC A02/MF A01

N84-19743

Unclas  
18598

CSC 20D G3/34

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
WASHINGTON, D.C. 20546  
DECEMBER 1983

ORIGINAL PAGE IS  
OF POOR QUALITY

STANDARD TITLE PAGE

1. Report No. NASA TM-77533	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle TABLE OF CONTENTS HYDROMECHANICS AND HEAT AND MASS EXCHANGE IN WEIGHTLESSNESS (RUSSIAN BOOK)		5. Report Date DECEMBER 1983	
		6. Performing Organisation Code	
7. Author(s) V.S. Avduyevskiy and V.I. Poleshayev, Editors		8. Performing Organisation Report No.	
		10. Work Unit No.	
9. Performing Organisation Name and Address SCITRAN Box 5436 Santa Barbara, CA 93108		11. Contract or Grant No. NASA- 3542	
		12. Type of Report and Period Covered Translation	
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, D.C. 20546		14. Sponsoring Agency Code	
13. Supplementary Notes  Translation of "Gidromekhanika i Teplo-massobmen v Nevesomosti," Academy of of Sciences USSR, Institute of Problems of Mechanics, "Nauka" Press, Moscow, 1982, pp. 261-263			
16. Abstract  The table of contents is given for a book on hydromechanics and heat and mass exchange in weightlessness. The book covers such subjects as hydromechanics, convection and heat and mass exchange, and technological experiments and complicated systems.			
17. Key Words (Selected by Author(s))		18. Distribution Statement  Unclassified - Unlimited	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 3	22. Price

# HYDROMECHANICS AND HEAT AND MASS EXCHANGE IN WEIGHTLESSNESS

## TABLE OF CONTENTS

Introduction	3
HYDROMECHANICS	
Slobozhanin, L. A. Problems of Stability of Fluid Equilibrium Developing in Questions of Space Technology	9
Yelagin, M. P.; Lebedev, A. A.; and Shmelev, A. V. Laboratory Modeling of Stability and Dynamics of Free Liquid Zones	24
Bezdenezhnykh, M. A.; Briskman, V. A.; Puzanov, G. V.; Cherepanov, A. A.; and Shaydurov, G. F. Influence of High-Frequency Vibrations on Stability of Fluid Interfaces	34
Kalyazin, E. L.; and Mednov, A. G. Physical Phenomena in Gas-Liquid Systems Under Conditions of Weightlessness and Weak Force Fields, and Recommendations for Modeling Certain Technological Processes	40
Barmin, I. V.; Senchenkov, A. S. Equilibrium Forms of a Melt During Crystallization of a Semiconductor in a Cylindrical Ampoule	48
Babskiy, V. G.; Kopachevskiy, N. D.; Myshkis, A. D.; Slobozhanin, L. A.; A. D. Tyuptsov Hydromechanics of Weightlessness: Certain Unresolved Problems	53
Kopachevskiy, N. D. Small Oscillations in Capillary Fluid Rotating in Partially Filled Vessels	59
CONVECTION AND HEAT AND MASS EXCHANGE	
Dubovik, K. G.; Nikikin, S. A.; Polezhayev, V. I.; Prostomolotov, A. I.; Fedyushkin, A. I. Convective Processes in Weightlessness and Their Importance in Problems of Space Technology	61
Berezovskaya, G. A.; Feonychev, A. I. Influence of Convection and Boundary Conditions for Temperature on Distribution and Admixture in a Cylindrical Ampoule with Fluid	72
Rivkind, B. Ya.; Sigovtsev, G. S. Problem of Drop Motion in a Nonuniform Temperature Field	78
Gershuni, G. Z.; Zhukhovitskiy, Ye. M.; Yurkov, Yu. S. Vibration Heat Convection Under Weightlessness Conditions	90

Bratukhin, Yu. K.; Briskman, V. A.; Zuyev, A. L.; Pshenichnikov, A. F.; Rivkind, V. Ya. Experimental Study of Thermocapillary Drift of Gas Bubbles in Fluid	98
Kirichenko, Yu. A.; Suprunova, Zh. A. Technique of Modeling Heat Exchange Process in a Closed Volume Under Conditions Close to Weightlessness	109
Chashechkin, Yu. D.; Popov, V. A. Methods of Laboratory Modeling of Convective Processes in Heterogeneous Systems Under Conditions of Normal and Reduced Gravity	119
Briskman, V. A.; Saranin, V. A. Possibility of Controlling Heat and Mass Exchange Processes Under Conditions of Weightlessness Using an Electric Field	147
Avgustinovich, I. G.; Podol'skiy, V. A.; Yakushin, V. I. Propagation of Light Rays in a Nonuniform Binary Gas Mixture Under Weightlessness Conditions	154
TECHNOLOGICAL EXPERIMENTS AND COMPLICATED SYSTEMS	
Lebedev, A. P.; Polezhayev, V. I. Mathematical Modeling of Perturbing Accelerations in Experiments of Space Technology	163
Leskov, L. V.; Savichev, V. V. Study of Physical Features of Technological Processes on Spacecraft	173
Agafonov, M. S.; Badareko, A. A.; Belokurova, I. N.; Bogdanova, N. F.; Zemskov, V. S.; Levto, V. L.; Leskov, L. V.; Mukhoyan, M. Z.; Romanov, V. V.; and Savichev, V. V. Study of Crystallization Under Conditions of Weightlessness of Melts with Free Surface	186
Khryapov, V. T.; Fedorov, V. A.; Kul'chitskiy, I. A.; and Markov, Ye. V. Technological Experiments on the Unit "Kristall" on the Station "Salyut-6"	191
Barmin, I. V.; Zemskov, V. S.; Raukman, M. R.; Senchenkov, A. S.; Yegorov, A. V.; Antipov, A. I.; Agapova, Ye. A. Heat and Mass Transfer in a Melt During Crystallization of Indium Antimonide in Weightlessness	209
Kurbatov, L. N.; Golovin, B. I.; Iz'yurov, A. V.; Komarov, N. V. Certain Features of Experiments to Produce Solid Melts of Cadmium-Mercury-Tellurium Conducted in the Orbital Station "Salyut-6"	219
Vlasenko, L. A.; Golovin, B. I.; Kurbatov, A. N.; Maksimovskiy, S. N.; Khaziyeva, R. A.; Kholina, Ye. M.; and Yurushkin, B. I. Crystallization of Germanium under Conditions of Microgravitation with High Velocities	221
Abramov, O. V.; Gel'fgat, Yu. M.; Semin, S. I.; Sorkin, M. Z.; Chashechkina, Zh. Yu. Crystallization in Two-Phase Systems Under Conditions of Quasiweightlessness	228

Kirichenko, Yu. A.; Slobozhanin, L. A.; Shcherbakova, I. S. Forms and Fragmentary Dimensions of Bubbles in a Field of Mass Forces of Different Intensity	241
Ilers, A. B. Dielectrophoretic Motion of Bubbles in Fluid Under Conditions of Reduced Gravity	243
Zhukov, M. Yu.; Yudovich, V. I.; and Babskiy, V. G. Electrophoresis of Biopolymers Under Weightlessness Conditions	248